

Evansville's wastewater treatment facility (WWTF) was built in 1982, designed to last for 20 years with a capacity of 600,000 gallons per day. At its most basic level, our WWTF is a series of open ponds. In the first ponds, blowers pump air into the wastewater, this oxidation contributes to the growth of biology, or bugs, that eat the nutrients in the wastewater. From the aeration ponds, the wastewater is transferred to a settling pond to settle out the solids. Eventually, the clean water is discharged into seepage ponds that allow the water to seep into the ground. Periodically, we pump stabilized sludge from the bottom of the ponds to apply to farm fields.

Analysis of the wastewater is performed at various steps in the process to ensure that the discharged water meets the standards of the Wisconsin Department of Natural Resources (DNR).

In the early 1990's the DNR established a new standard for nitrates in the groundwater. Nitrogen, of which nitrates are one form, occurs naturally in residential waste, so it is nothing special or unique. But our WWTF was not designed to remove it from the wastewater.

A condition of our current (April 2006) wastewater discharge permit was to address our ability to meet the groundwater limit of 10 milligrams per liter for nitrates and report a plan by December 2008. In the fall of 2006, we installed several monitoring wells both above and below the WWTF to evaluate the amount of nitrate in the groundwater due to the discharge at the WWTF. The resulting analysis is that we are not consistently meeting the limits for nitrates or chlorides.

The requirement to change our wastewater treatment to reduce nitrates is the factor behind some significant upgrades for our WWTF.

The option initially considered would add insulated covers to the ponds and adding a treatment process to treat the nitrates. This would enable removal of the nitrates, on a year-round basis. The preliminary estimated cost is \$2.6 million for construction plus higher operating costs around \$20,000 per year for methanol.

Even though we are several years beyond the WWTF designed lifespan, the plant runs at about 75 to 85 percent of its designed capacity. So this option would address the nitrates issue and allow us some five to ten years before growth required an enlargement of the facility. Unfortunately, the pond system takes up a lot of space and there is little room for future expansion.

The Public Works Committee and City Council have had some early discussions about evaluating other options that would be more cost effective in the long run.

Other options would involve constructing a mechanical plant with an aerobic digester for around \$3.2 million. In addition to addressing the treatment needs, this would increase the WWTF's capacity and meet the city's needs for the next 20 years. The design would

also allow for future expansion when needed. The mechanical plant would also have lower operating costs without the chemical treatment and lower electricity needs.

On Tuesday, City Engineer Dave Sauer, Public Works Superintendent Dave Wartenweiler, WWTF Operator Ray Nipple, and I toured three different mechanical plants.

The facility in Brodhead was built in 1998 and treats about 300,000 gallons per day. It utilizes what is called an oxidation ditch, essentially an oval-shaped concrete channel. A number of large discs rotating on a spindle stir air into the wastewater. After the oxidation ditch, the wastewater goes through a mechanical clarifier to separate clean water from dirty water. The dirty water is returned to the aerobic digester; while, the clean water is disinfected with ultra-violet light and discharged to the river. An aerobic digester decomposes the nutrients in the solids, so the sludge can be applied to farm fields.

Lake Geneva has a different oxidation ditch system built in 1985 and treats 1.5 million gallons per day. This system has a series of three concentric channels with several spindles of discs aerating the wastewater in each of the channels. Their clean water is pumped via an eighteen-inch forcemain two miles to a former gravel pit where it is able to infiltrate into the ground similar to our seepage ponds. An anaerobic digester decomposes the nutrients in the solids, so the sludge can be applied to farm fields.

Jefferson's facility was built in the mid 1980's. One of its features is an aeration basin. Blowers diffuse air into the wastewater. This step is similar to our aeration ponds, but the confined space allows it wastewater to pass through the process in a matter of hours rather than a matter of days. After a clarifier process and ultraviolet treatment, the clean water is discharged to the river.

Like Lake Geneva, Jefferson has an anaerobic digester, meaning the bacteriological process acts in a non-oxygenated environment. The anaerobic digester produces methane gas as a byproduct. Jefferson captures the methane to assist in heating the sludge from the plant; however, even at just under two million gallons of wastewater per day it is too small of an operation to cost-effectively generate electricity. Their sludge is also applied to farm fields.

Evansville's proposed upgrades appear to be in the \$2 to \$3 million range, and operating costs and energy use will play a decisive part in the overall selection. Whether we go with the insulated covers or a mechanical system, the DNR requires us to go through a facility planning process to examine several alternatives. Later this summer, public comments will be a part of the process. The facility planning report, with a preferred alternative, will include an evaluation of the capital and operating and maintenance costs of each alternative. The DNR has up to ninety days to review the report. After DNR approval, actual engineered design can begin.

The facility planning process has started and the report is expected to be submitted to the DNR late this summer or early fall. Construction will likely begin in 2009 and be completed in 2010.

**Note of Thanks**

If you saw a bunch of youngsters with brooms and rakes last Friday, they were students from Theodore Robinson Intermediate School. They filled our dumpster with all their spring cleaning downtown. Thank you to the kids, Nancy Greve-Shannon, and Evansville Community Partnership.